SUPPLEMENTAL REPORT

OF

CATARACT EXTRACTIONS.

BY

P. D. KEYSER, M.D.,

SURGEON TO THE WILLS OPHTHALMIC HOSPITAL, PHILADELPHIA.

EXTRACTED FROM THE TRANSACTIONS OF THE MEDICAL SOCIETY OF THE STATE OF PENNSYLVANIA FOR 1875.

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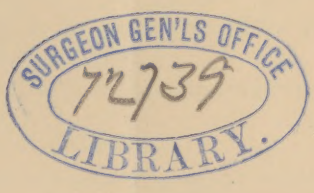

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SUPPLEMENTAL REPORT OF CATARACT EXTRACTIONS.

Since the publication of my report of cataract operations, read before this society last year, I have been frequently asked to explain the fractions used in the result of vision obtained. Very few of the general practitioners throughout the State understand what is meant by the expression Vn. $\frac{20}{\text{L}}$, $\frac{20}{\text{C}}$, $\frac{15}{\text{LXX}}$, etc., as is found in the column under the head of Results.

For the examination of vision, we have sets of letters that are ranged in size according to the distances they are clearly distinguished by the normal eye.

Dr. Snellen, of Utrecht, Holland, has taken as the unit for comparison the recognition of letters at an angle of five minutes (the smallest angle at which objects of known size can be distinguished), and from this has determined the dimension of letters that can or should be clearly seen by the normal eye at different distances.

Prof. Jäger, of Vienna, has also a set of types for the testing of vision, but he has not measured them so accurately as Snellen. He only arranged types from the smallest size to quite large, and numbered them without regard to the measurement of the distance which they should be seen.

For ordinary tests, Jäger's types are quite practicable; but for the proper measurement of the distance and the acuity of vision, Snellen's types are much the better.

For reading, we have the following as the smallest size of types:—

JÄGER'S 1.

The hearing ear, and the seeing eye, the Lord hath made even both of them. The glory of young men is their strength: and the beauty of old men is the gray head. Train up a child in the way he should go: and when he is old, he will not depart from it. If thine enemy be hungry, give him bread to eat; and if he be thirsty, give him water to drink. Truly the light is sweet, and a pleasant thing it is for the eyes to behold it. Let us hear the conclusion of the whole matter: Fear God and keep his commandments: for this is the whole duty of man. For God shall bring every work into judgment, with every secret thing, whether it be good, or whether it be evil.

SNELLEN'S $1\frac{1}{2}$.

The light of the body is the eye: if therefore thine eye be single, thy whole body shall be full of light. Ask, and it shall be given you; seek, and ye shall find; knock, and it shall be opened unto you: But seek ye first the Kingdom of God, and his righteousness, and all these things shall be added unto you. Therefore all things whatsoever you would that men should do to you, do ye even so to them: for this is the law and the prophets. Even so every good tree bringeth forth good fruit; but a corrupt tree bringeth forth evil fruit.

Jäger's to be read at one foot and Snellen's at one foot and a half distant from the normal eye.

For distant vision Snellen takes the range of twenty feet, for which distance letters of this size should be distinguished—

U Y A C E

and are marked XX.

For thirty (XXX) feet we have

F H K O

For forty (XL) feet—

V Z B D

For fifty (L) and for seventy (LXX) feet the letters still increase in size at the rate of 2.094 Paris lines for every ten feet. And for one hundred (C) feet—

C E

should be distinguished. A letter twice the size of C E is for two hundred (CC) feet.

For the result of vision, then, the lower figures of the fraction designate which line of letters on the card is distinguished, and the upper figures the distance from the card the patient is sitting. Thus, $\frac{20}{XL}$ is, that the letters V Z B D are distinguished at 20 feet distance in a good light, and after the cataract operation with the proper convex glass, making the vision $\frac{20}{XL,}$ or equal to $\frac{1}{2}$, and so on.

It is rare to get, after the operation for cataract, vision of $\frac{20}{XX}$ =1. V. Graefe, in his first statistics, reported all with a vision of $\frac{20}{C}$ = to $\frac{1}{6}$th, as perfect success, but subsequently he reduced it to $\frac{20}{CC}$ = to $\frac{1}{10}$th, the figure now generally taken as the standard of perfect success. Many with less than this see to go about without aid, although not able to read, yet still much better off than before the operation.

As the extraction of cataract is such a complicate and delicate procedure, statistics of results are always desirable, not only for comparison to judge which is the best method of operation, but to gain all the experience of the operator in the manipulations, complications, after-treatment, etc., I add the following statement of 47 extractions which I made during the year 1874.

In my report last year for the six years previous, I noticed all the extractions I had made by the different methods used, but in the following supplemental report the extractions were all made according to v. Graefe's modified peripheric linear method. In my own experience I find this method the one that gives the best results in recovery from the operation, although I really do not think that the average result of vision is any better, if so good, as in the successful operations by the methods where no iridectomy is made, and the pupil kept in its normal condition.

It is natural that we desire to get as perfect vision after the operation as possible; but the great desideratum, however, is a successful issue from the operation, even with half or quarter vision, which is better than none; and it is a well-acknowledged fact that the percentage of recovery by v. Graefe's method is greater than by any of the others; although it is not advisable to make every operation in this way. The operator must be the judge of what is the best and safest for the patient.

No.	Sex.	Age.	General health.	Quality and duration of cataract.	Functional examinat'n.	Date of operation.	Incidents of operation and Remarks.	Length of treatment.	Resulting vision and date of record.
						1874.			
1	Male	29	Good	Traumatic	Good	Feb. 26	....	17 days	$\frac{20}{XXX}$
2	"	58	"	Senile, 3 years	"	Mar. 5	Lens large	12 "	$\frac{20}{XXX}$ read Sn. $1\frac{1}{2}$, 6 w'ks after.
3	Female	69	"	Senile, 1 year	"	" 11	....	20 "	$\frac{20}{XXX}$ 2 months after.
4	"	50	"	Senile	"	" 19	....	23 "	$\frac{20}{XL}$ Sn. $1\frac{1}{2}$, 4 weeks after.
5	Male	24	"	Traumatic	"	April 4	....	18 "	$\frac{20}{XL}$
6	Female	62	"	Senile, 2 years	"	" 16	Diameter of the cornea 9 mm. Congenital coloboma of iris downward. Incision made across the coloboma. Lens removed by scoop; quite large.	16 "	$\frac{22}{C}$ 7 months.
7	"	70	"	Senile, 1 year	"	" 22	....	19 "	$\frac{20}{C}$
8	Male	79	"	Senile, 2 years	"	" 22	On attempting to press the lens out, vitreous came forward; scoop used; a little vitreous lost.	21 "	$\frac{20}{XXX}$ 4 weeks. $\frac{20}{XX}$ and Jäg. 1, 7 months.
9	"	62	"	Senile, 1 year	"	" 27	....	21 "	$\frac{20}{LXX}$ 3 weeks.
10	Female	70	"	Senile, 2 years	"	" 30	....	16 "	$\frac{20}{XL}$ 2 months.
11	Male	36	"	Traumatic	"	" 30	....	22 "	$\frac{20}{C}$
12	"	61	"	Senile, 2 years	"	May 5	....	16 "	$\frac{10}{XII}$ Sn. $1\frac{1}{2}$, 24 days.

No.	Sex.	Age.	General health.	Quality and duration of cataract.	Functional examinat'n.	Date of operation.	Incidents of operation and Remarks.	Length of treatment.	Resulting vision and date of record.
						1874.			
13	Male	78	Good	Senile, 2 years	Pretty g'd, but iris did not dilate well	May 11	Nucleus small, much cortical removed by pressure; 3 days after iritis; occlusion of the pupil; Oct. 21st made iridotomy; considerable hemorrhage in anterior chamber.	35 days	Jäg. 20 at 12 inches; fingers at 6 feet; goes about alone.
14	Female	76	"	Senile	Good	" 21	....	14 "	20/L Jäg. 1, 22 days.
15	Male	30	"	Soft	"	" 21	....	12 "	20/XL
16	"	71	"	Senile, 4 years	"	" 22	....	16 "	20/L Jäg. 2, 1 month.
17	Female	70	"	Senile, 2 "	"	" 23	....	20 "	20/XL
18	"	70	"	Senile, 4 "	"	" 23	....	21 "	20/LXX Jäg. 5.
19	Male	24	"	Soft, 2 "	"	" 26	....	26 "	20/C 26 days.
20	"	65	"	Senile, 5 "	"	" 30	Considerable hemorrhage in anterior chamber; scoop used.	20 "	20/L 3 weeks.
21	"	73	"	Senile, 1 year	"	June 10	....	14 "	20/LXX
22	"	69	"	Over ripe	Pretty good	" 11	Scoop used; slight escape of vitreous.	30 "	20/CC 4 months.
23	"	74	"	Senile	Good	" 24	....	19 "	20/C
24	"	50	"	Senile	"	Aug. 1	....	27 "	20/CC
25	"	55	"	Senile, 2 years	"	Sept. 15	....	17 "	20/C Sn. 2, 3 months.

No.	Sex.	Age.	General health.	Quality and duration of cataract.	Functional examinat'n.	Date of operation.	Incidents of operation and Remarks.	Length of treatment.	Resulting vision and date of record.
26	Male	21	Good	Traumatic	Good	1874. Sept. 17	....	13 days	$\frac{20}{LXX}$
27	Female	35	"	Soft, 2 years	"	" 19	Some capsule remained; removed.	28 "	$\frac{20}{L}$
28	"	71	"	Senile	"	" 25	....	15 "	$\frac{20}{XL}$ Sn. $1\frac{1}{2}$, 7 months.
29	"	68	"	Senile	"	" 30	....	18 "	$\frac{20}{LXX}$ Sn. $1\frac{1}{2}$.
30	Male	78	"	Senile, 2 years	"	Oct. 12	....	20 "	$\frac{20}{C}$ Jäg. 5, 1 month.
31	"	69	"	Senile, 1 year	"	" 13	....	14 "	$\frac{20}{XL}$ 2 weeks.
32	Female	35	"	Soft, 2 years	"	" 17	....	34 "	$\frac{20}{L}$ Sn. 2, 34 days.
33	Male	74	"	Senile	Pupil did not dilate well; good.	" 20	Made iridectomy 20 days previously.	17 "	$\frac{20}{XX}$ Sn. $1\frac{1}{2}$, 3 weeks.
34	"	69	"	Senile, 6 mos.	Good; pupil did not dilate well	" 21	Made iridectomy 6 weeks previously. By sudden contraction and jerk of the ball downward the lens and some little vitreous were forced out. Two capsular threads remained across the pupil; torn through 5 weeks after.	6 weeks altogether	$\frac{20}{L}$ Sn. 2, 8 weeks.
35	Female	62	"	Senile, 2 years	Pupil did not dilate well; good.	Nov. 2	Iridectomy 3 months previously.	14 "	$\frac{20}{C}$ 2 weeks.
36	Male	73	"	Senile, 1 year	Good	" 12	....	14 "	$\frac{20}{XL}$ Sn. $1\frac{1}{2}$, 18 days.

No.	Sex.	Age.	General health.	Quality and duration of cataract.	Functional examinat'n.	Date of operation.	Incidents of operation and Remarks.	Length of treatment.	Resulting vision and date of record.
37	Female	75	Good	Senile, 6 years	Good	1874. Nov. 14	2d night after patient tore off bandage and applied chewed tobacco over the eye; no injury therefrom; slightly deranged.	14 days	Never could read, but could tell the time promptly on watch, and count figures at 25 feet, equal to about $\frac{20}{C}$.
38	"	62	"	Senile	"	" 18	....	19 "	$\frac{20}{C}$ Jäg. 5, 19 days.
39	"	50	"	Senile, 2 years	"	" 19	Slight hemorrhage in ant. chamber; the clot drawn out with the ant. capsule by iris forceps after rupture.	18 "	$\frac{20}{XL}$ Sn. $1\frac{1}{2}$, 1 month.
40	"	70	"	Senile	"	" 30	....	18 "	$\frac{20}{C}$ 18 days.
41	Male	61	"	Senile, 2 years	"	Dec. 1	....	17 "	$\frac{20}{L}$ Sn. 2.
42	Female	65	Not good	Senile	Pretty good	" 3	On making the incision the patient forced and dislocated the lens downward, and vitreous came forward; scoop used.	18 "	$\frac{20}{C}$ 18 days.
43	"	80	Feeble	Senile, 4 years	Good; iris did not dilate well.	" 5	Iridectomy 8 weeks previously	13 "	$\frac{20}{XXX}$ 1 month
44	"	63	Good	Senile, 1 year	Good	" 7	....	17 "	$\frac{20}{L}$ Sn. $1\frac{1}{2}$, 5 weeks.
45	"	52	"	Cortical, 20 y'rs	"	" 15	Had not read for 25 years with either eye	15 "	$\frac{20}{LXX}$ Sn. $2\frac{1}{2}$, 7 weeks.
46	Male	30	"	Traumatic	"	" 22	....	30 "	$\frac{20}{L}$
47	Female	54	"	Senile, 6 years	"	" 29	....	16 "	$\frac{20}{L}$ Sn. $1\frac{1}{2}$, 4 weeks.

NOTE.—Under "Functional examination" is understood that the position of a light (flame) can be properly distinguished and designated in a darkened room when held at considerable distance from the eye.

The acuity of vision obtained was:—

In 2 cases	$\frac{20}{XX}$	=	1
" 1 case	$\frac{10}{XII}$	=	$\frac{5}{6}$
" 4 cases	$\frac{20}{XXX}$	=	$\frac{2}{3}$
" 9 "	$\frac{20}{XL}$	=	$\frac{1}{2}$
" 10 "	$\frac{20}{L}$	=	$\frac{2}{5}$
" 6 "	$\frac{20}{LXX}$	=	$\frac{2}{7}$
" 1 case	$\frac{22}{C}$	=	$\frac{1}{5}$
" 11 cases	$\frac{20}{CC}$	=>	$\frac{1}{5}$
" 2 "	$\frac{20}{CC}$	=	$\frac{1}{10}$

" 1 case moderate. Able to go about unaided, but cannot read finer than Jäger 20 at 12 inches.

Classified according to the success of result of vision, we have:—

Vision to $\frac{1}{10}$th as perfect 46 cases = $97\frac{41}{47}$ per cent.
" less than $\frac{1}{10}$th as moderate 1 case = $2\frac{6}{47}$ " "

Besides these 47 extractions, I made 5 dicisions for soft cataract during the year, but as I am only reporting the extractions I will give no history of them.

In my report of last year I presented the cases of 132 extractions by different methods, which with these 47 make a total of 179 operations during the past 7 years (by von Graefe's method 167, by Daviel's 4, by Pagenstecher's 3, by Liebreich's 3, by Bowman's suction 3), with the following results:—

Perfect success,	160 cases	=	$89\frac{69}{179}$ per cent.
Moderate (containing 1 imperfect improved by operation),	11 "	=	$6\frac{26}{179}$ " "
Imperfect and complete loss,	8 "	=	$4\frac{84}{179}$ " "
Total good success,			$95\frac{95}{179}$ " "

From my experience in the past years, I present the following few practical observations that occur to me as pertinent to success in the operation for the removal of cataract by v. Graefe's method.

The pupil should be well dilated for at least two to four hours previous to the operation by the use of a four-grain solution of sulphate of atropia. By so doing the blood is forced out of the vessels of the iris back into the posterior uveal region, thereby lessening the liability and danger of hemorrhage from the iris after the iridectomy.

When the pupil will not dilate well, it is advisable to make the iridectomy some six or eight weeks previous to the extraction of

the lens. For it is the experience of most operators that in such cases there is a tendency to inflammation, and iritis will ensue if the iridectomy and extraction are made at one time.

I have found it of great advantage to keep the iris well dilated, after the operation, by the instillation of atropia every twenty-four hours until the eye is well. It reduces the tendency to iritis by retarding the excessive flow of blood through the vessels of the iris; it also prevents the edges of the iris from becoming attached to the ends of the ruptured capsule, and it gives room for the swelling of any little particles of soft cortical that may be left in the anterior chamber, from which injurious effects might arise by their pressing against and irritating the iris if not dilated.

The danger from leaving particles of cortical in the anterior chamber and behind the iris is so great, that every careful exertion should be made for its removal. The first of all should be to make the incision of the cornea large enough to allow free exit of the lens, and any soft cortical, on gentle pressure. If it is not, the hard nucleus will come out and the cortical be scraped off by the edges of the wound and held back in the chamber and behind the iris. In such cases it should be delicately worked from under the iris and out of the chamber by light pressure and sliding movements over the cornea with the scoop or the finger on the lower lid, but not by introducing the scoop into the eye. This I have always found dangerous and liable to create inflammation; although the primary movement of removing the lens by means of the scoop does not seem to be so deleterious. The explanation of which no doubt is, that in the primary movement the lens protects the rubbing or scraping of the posterior surface of the iris in the manœuvre of scooping the lens out; while in the secondary movement of removing small particles of cortical from the chamber and from behind the iris, there is the danger of scraping the posterior surface of the iris with the instrument, and thereby causing inflammation. My experience is, that the fewer and the lighter the manipulations are on the eye, after extraction, the better for the successful termination of the operation.

The removal of the piece of anterior capsule in the pupillary region after its rupture by the cystotome, as recommended by Dr. Knapp, I consider of very great importance, as it relieves the eye of the danger of iritis and closure of the pupil, which might take place by its becoming adherent to the iris, as well as the greater danger of irido-cyclitis and sympathetic ophthalmia, which can supervene if it should lie out and become attached in the corneal wound. The best method for the rupturing of the capsule is that

recommended by v. Graefe, *i. e.*, to tear with the cystotome horizontally, then on either side (two parallel lines), after which, remove the piece or flap with the forceps before the extraction of the lens.

Any little clots of blood that may form in the anterior chamber, either from the iris or run in through the corneal incision from the conjunctival wound, should be removed to prevent attachment to and irritation of the iris. Both the clot and capsule can be removed at the same time in one movement by drawing them out with the iris forceps. If, after the lens has been removed, it is seen that the posterior capsule has a striated or thickened appearance, secondary cataract may be expected. To prevent a second operation I rupture this capsule by tearing it with the iris forceps just before closing and bandaging the eye. I have done this in several cases, without any serious loss of vitreous and danger to the eye, and with perfect success in results of vision in all the cases.

If the vitreous should come forward before the lens, it is well to grasp the edge of the incision with the fixation forceps and hold it up; by so doing the pressure is removed, and the vitreous falls back into the bulb again or stops flowing. The lens should be removed at once by the scoop while still holding the edge of the wound up, and any soft cortical that may be left can also be removed if the vitreous is not too fluid. In such cases it must be allowed to remain, and trust to atropia and absorption for the result.

Before bandaging the eye, it should be carefully examined, to see if the edges of the incised iris are not caught in the corners of the corneal wound; if so, they must be pushed back into the chamber by the scoop or Daviel's curette, or drawn out and snipped off. This is extremely necessary, for from such adhesions of the iris in the wound, inflammation of the iris and ciliary body is likely to take place, resulting often in sympathetic ophthalmia, requiring enucleation of the operated eye, or loss of vision in both. To remove the liability of the edges of the incised iris becoming attached in the corners of the corneal wound, some operators do not put atropia in the eye previous to the operation, claiming, that, when the iris is not under the influence of its action, the edges recede spontaneously into their proper place after the iridectomy. I have not found that there is any advantage in not dilating the pupil; for, by drawing slightly on the pupillary rim of the iris, and then cutting close to the cornea, in the great majority of cases it immediately falls back to its place. If not, a little rubbing over the eyeball will assist it. When a conjunctival flap is made, it must be laid into its place, and not allowed to remain turned back over

the cornea. Sloughing might take place, to the endangerment of the eye.

The bandage should be wrapped evenly and firmly, but not tightly, over the eyes and around the head. Too much charpie or cotton-wool should not be placed over the eye, for the bandage then could not be firmly applied without drawing it too tightly, and by so doing there will be pressure on the eye, and give pain and suffering to the patient. The bandage which I have found the most useful and serviceable is the roll of flannel, as recommended by v. Graefe. It lies flat and even over the face and around the head, and does not slip; and if properly applied will remain for several days, if necessary, as perfect as when put on, and allows the patient to turn or rise without its becoming displaced.

In warm weather, remove the flannel bandage after the third or fourth day, and apply a piece of black silk just large enough to cover the eyes, and fasten in place by tapes that are sewed to the outer or temporal edges and passed around the head and tied.

It is prudent never to allow the patient to rise or turn from the lying position on the back for at least two or three hours after the operation. This is to prevent any detachment of the vitreous and retina from the fundus of the eye, which might take place (by the law of gravity) if the patient rises or turns on either side before the aqueous humor has reformed and filled out the convexity of the cornea and the space formerly occupied by the lens. This I consider a very particular rule, and impress it strongly upon my patient. After the agglutination of the edges of the corneal incision, and the filling up of the anterior chamber with the aqueous, so as to give the eyeball its proper form, there is then no danger of such detachments, and the patient can sit up and lie down at pleasure.

Any secondary operation that may be necessary, should not be made until all the inflammation and irritation of the first have entirely disappeared.